Multi-County Goods Movement Action Plan

Technical Memorandum 4b: System Performance Report

Prepared for:

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California Department of Transportation
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E.1 INTRODUCTION

Tech Memo 4a – Freight Demand presented baseline travel demand forecasts for both rail and truck and identified potential scenarios for future evaluations. Those baseline forecasts provide projections of rail volumes (to 2025) and truck volumes (to 2030), recognizably different years, but still the years for which data are available. It documents projected levels of goods movement activity in the study area, and outlines four alternative scenarios for future growth and investment in goods movement facilities. Technical Memorandum 4b – System Performance Report presents the potential for future performance under baseline conditions and travel demand on the rail and highway networks within the Multi-County Goods Movement Action Plan (MCGMAP) study area.

This report summarizes the performance measures and capacity improvements assumed for both rail and highway networks for the target years – 2025 for rail and 2030 for highways.

- **Performance Measure** – Quantitative indicator of how future systems compare to baseline conditions based on projected growth.
- **Improvements Assumed** – Capacity improvements identified to accommodate the projected growth.

E.2 KEY FINDINGS

The document is divided into two sections addressing rail and highway system performance. Key findings are summarized below.

Rail

The future year performance of the BNSF and UP mainlines east of Los Angeles was the subject of the 2002 *Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study*. That study assumed mainline train volumes similar to those presented in Tech Memo 4a. Therefore, the assumption has been made that the two volume forecasts – given similar assumptions of mainline rail capacity and operating patterns – would generate similar performance.

The 2002 study assessed the BNSF and UP mainline performance in terms of various scenarios. One was the Status Quo Alternative, that is, the railroads run trains much as they do today. Another was Alternative 1a, which assumed that UP will concentrate more freight traffic on a combination route of the Los Angeles Subdivision between Los Angeles and Pomona and the Alhambra Line between Pomona and West Colton – the same operating pattern which the WSA forecast assumed.

Further assuming major rail line capacity enhancements, the 2002 study predicted that the Status Quo Alternative would result in average delays per freight train in 2025 of 30.6 minutes on the BNSF and 23.7 minutes on the UP. By contrast, Alternative 1a would result in average delays per freight train in 2025 of 28.7 minutes on the BNSF and 14.7 minutes on the UP. Absent the line

capacity improvements, delays for both BNSF and UP on mainlines east of Los Angeles would be about 200 minutes per train by 2010, according to the study. With the capacity improvements assumed in the study, delays in 2025 would be at or less than 2000 levels.

Highway

State highway growth projections for the study area were prepared using the Southern California Association of Governments (SCAG) Draft 2030 Air Quality Management Plan (AQMP) Baseline model. This includes all types of truck including light, medium and heavy duty. The forecast truck volumes for the Year 2030 indicate the following:

- By 2030, the daily truck volumes on I-5 between SR-55 and SR-57 show an increase of more than 50% from a little more than 20,000 in 2003 to about 34,000.
- Truck volumes on a section of I-110 between I-105 and I-10 increase from 15,000 to almost 30,000 by 2030, and volumes on I-405 between I-110 and SR-91 escalate from 11,000 to more than 24,000 by 2030, an increase double or more than 2003 truck volumes.
- US-101 will experience significant increase in truck volumes between I-110 to SR-170 from 7,000 to 35,000 by 2030 and between SR-170 to I-405 from 8,000 to 26,000, an increase of more than 300% and 200%, respectively, when compared to 2003.
- SR-60 from its terminus to I-710 shows an increase of approximately 110% from 10,000 in 2003 to more than 21,000 daily volumes by 2030.
- I-605 between SR-91 and I-105 shows an increase from 11,000 to almost 29,000, an approximately 150% increase in daily volumes.

Some of the congested segments in the study area for the Year 2030 that will have to accommodate growing traffic greater than their current capacities during the AM peak period and PM peak period (thus experiencing significant traffic delays) are listed below:

- I-5 between SR-118 and SR-14
- I-405 between I-10 and SR-118
- I-15 between SR-91 and SR-74 and through Cajon Pass
- I-215 between SR-74 and SR-60
- SR-14 between I-5 to SR-138
- I-5, US-101, I-10, and I-110 around the vicinity of downtown Los Angeles

E.3 CONCLUSIONS

The future performance of the MCGMAP study area's rail and highway network is directly linked to the substantial increase on volumes forecast. As shown in Tech Memo 4a, both freight and passenger volumes are forecast to increase on all MCGMAP study area rail lines and highways. Current planning efforts have identified a number of required improvements to accommodate baseline future conditions; however, the system will still face performance challenges.

On the MCGMAP study area rail lines, increased freight volumes to and from the Ports of Los Angeles and Long Beach combined with increased passenger rail service along already congested lines will lead to potential delays along the rail network. The delays would increase on the BNSF freight line from 32 minutes in 2000 to 206 minutes by 2010 and on the UP freight line from 30 minutes in 2000 to 197 minutes by 2010 per train. These delays will impact both passenger service and freight supply chains. Planning efforts are underway; however, there is still an identified capacity constraint in terms of the number of tracks available and the demand for both passenger and freight service along shared lines.

The MCGMAP study area highways will see a similar increase in both freight and passenger volumes. The baseline forecasts for the SCAG region show approximately 3,096,000 truck trips per day. Truck trips would account for approximately 39,482,000 vehicle miles of travel (VMT) per day out of the approximately 508,807,000 VMT for all vehicles. Significant delays and capacity constraints will occur along portions of I-5, I-405, I-15, I-215, SR-14, I-10, I-710, SR-60, US-101, and I-110. The performance measures discussed in this report take into account baseline improvements identified through recent planning efforts; however, it is clear that substantial congestion and delays would continue to persist without improving system capacity.

1.1 RAIL NETWORK

This section reviews and evaluates the capacity of the mainline railroad system east of Los Angeles (both the freight-rail and passenger-rail system), and its ability to keep pace with the expected growth of the economy through Year 2025. It also describes the capacity improvements required to meet the rail traffic demand.

There are two major freight hauling railroads serving the study area. These are the Union Pacific Railroad (UP) and the Burlington Northern and Santa Fe Railway (BNSF). The three east-west rail lines that provide connections between Los Angeles and the transcontinental rail system in the study area are the BNSF Transcon, the UP Los Angeles Subdivision, and the UP Alhambra Line. The BNSF Transcon runs from San Bernardino to downtown Los Angeles, where it connects to the triple track Alameda Corridor and thus to the Ports of Los Angeles and Long Beach. The UP Los Angeles Subdivision runs from West Riverside to downtown Los Angeles, and the UP Alhambra Line runs from Colton to downtown Los Angeles. Both UP lines connect in Los Angeles to the Alameda Corridor and to the north-south rail routes for UP – the Coast and the Santa Clarita Lines.

Metrolink, the commuter rail service provided by the Southern California Regional Rail Authority, operates its 91 Line service, its Inland Empire Orange County Line service, and its Orange County Line service on the BNSF Transcon. Its Riverside Line service operates on UP's Los Angeles Subdivision. Amtrak's long distance Southwest Chief and Pacific Surfliner corridor trains also operate on the Transcon. Amtrak's Sunset Limited operates on the UP's Alhambra Line. These railroad mainlines are shown in Figures 1 and 2.

For these mainlines, the impact of capacity constraints is a reduction in system velocity, which results in delay and increased backlog along the rail lines as well as at the rail yards. Currently, the average train trip is delayed by over 30 minutes east of Los Angeles[1]. A back-up in the system can be far reaching, resulting in the delay of time-sensitive shipments to customers across the region.

Metrolink is planning major increases in passenger trains using BNSF and UP mainlines in the study area; these increases will further strain capacity in the absence of any improvements. Metrolink trains are most frequent during the morning and afternoon weekday commute periods, and are oriented inbound to Los Angeles in the morning and outbound in the afternoon. About a third of Metrolink trains operate on BNSF and UP mainlines today.

Amtrak Pacific Surfliner corridor trains will likely increase in the future, with the increases potentially contributing to congestion and train delay on the mainlines.

Source: The Professional Railroad Atlas of North America, Edition 2

Figure 1

RAILROADS AND MAINLINES IN THE MCGMAP STUDY AREA SERVING CALIFORNIA, ARIZONA, NEVADA, AND OREGON

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Figure 2
BNSF TRANSCON WEST OF SAN BERNARDINO, UP LOS ANGELES SUBDIVISION, AND UP ALHAMBRA LINES
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1.2 RAIL FORECASTS

The freight and passenger trains' summary rail forecasts shown in Table 1 were derived from the Wilbur Smith Associates team's forecasts presented in Tech Memo 4a. Freight volumes include intermodal and carload traffic on the BNSF and UP mainlines. Passenger rail forecasts include Amtrak long distance trains, Amtrak Pacific Surfliner corridor trains (Corridor) , and Metrolink commuter trains. The forecasts were based on the most recent available data from BNSF, UP, Amtrak, and Metrolink.

Table 1
2025 Forecast of Trains per Day by Segment

	FACILITY TYPE/PROVIDER					
TRACK SEGMENTS	**BNSF**	**UP**	**Amtrak**	**Corridor**	**Metrolink**	**Total**
BNSF						
Barstow-San Bernardino	131	29	2			**162**
San Bernardino-Colton	111	29	2		40	**182**
Colton-West Riverside	111	37	2		40	**190**
West Riverside-Atwood	111		2		66	**179**
Atwood-Fullerton	102		2		26	**130**
Fullerton-Hobart	102		2	32	74	**210**
Hobart-Redondo	74		2	32	74	**182**
Atwood-Orange	9				40	**49**
Fullerton-Orange				32	48	**80**
Orange-Irvine/San Juan Capistrano/Oceanside/San Diego	9			32	88	**129**
UP						
East Los Angeles-Pomona (LA Sub)		82			44	**126**
Pomona-Mira Loma (LA Sub)		30			44	**74**
Mira Loma-West Riverside (LA Sub)		37			44	**81**
Pomona-Los Angeles (Alhambra Line)		36	1			**37**
Pomona-West Colton (Alhambra Line)		112	1			**113**
Los Angeles-Burbank		18	2	14	78	**112**
Burbank-Coast Line		12	2	14	36	**64**
Burbank-Palmdale		6			42	**48**
Palmdale-Colton		27				**27**
Colton-El Paso Line		80	1			**81**
Alameda Corridor						**144**
Colton Crossing	111	101	3		40	**255**
Cajon Pass	160	27	2			**189**

Source: Wilbur Smith Associates, 2006

Figures 3 through 5 show the train volumes per day for the Year 2025 for freight trains, commuter trains, and freight and passenger trains combined.

Legend

Volumes (Trains/Day)

- 0 - 18
- 19 - 37
- 38 - 112
- 113 - 160
- 161 - 212

- Water
- Urban Areas
- County Boundary
- Freeways
- Ports
- Airports

Year 2025 Forecast of Freight Rail Volumes on the Study Area Mainlines

Source: Wilbur Smith Associates, 2006
TeleAtlas StreetMap USA

0 2.5 5 10 15 20 Miles

N

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Figure 3

Legend

Volumes (Trains/Day)

- 1 - 26
- 27 - 50
- 51 - 92
- 93 - 120

- Water
- Urban Areas
- County Boundary
- Freeways
- Ports
- Airports

Year 2025 Forecast of Commuter Rail Volumes on the Study Area Mainlines

Source: Wilbur Smith Associates, 2006
TeleAtlas StreetMap USA

0 2.5 5 10 15 20 Miles

N

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Figure 4

Legend

Volumes (Trains/Day)

- 27 - 49
- 50 - 81
- 82 - 130
- 131 - 162
- 163 - 255

- Water
- Urban Areas
- County Boundary
- Freeways
- Ports
- Airports

Year 2025 Forecast of Freight and Passenger Rail Volumes on the Study Area Mainlines

Source: Wilbur Smith Associates, 2006
TeleAtlas StreetMap USA

0 2.5 5 10 15 20 Miles

N

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Figure 5

1.3 SYSTEM PERFORMANCE

Performance Measures

Growth in freight demand, combined with forecast growth in passenger demands, will contribute to increased congestion and reduced performance of the region's rail transportation system unless major capacity enhancements are made. The performance of the rail transportation system in the study area can be assessed based on two parameters:

- **Rail Volume** – The rail traffic for the Year 2025 derived from previous studies assumes growth rates that apply to various types of freight traffic with port-related intermodal traffic growing faster than either domestic intermodal or carload traffic on the BNSF Transcon, the UP Alhambra Line and the UP Los Angeles Subdivision.

- **Train Delay** – The principal determinant of velocity, or the average speed of trains, is train delay due to congestion, or simply too many trains on too little track.

The projected growth in freight and passenger railroad traffic can be accommodated provided certain capacity improvements are carried out on the rail lines. With a maximum capacity of 50 trains per day per line, both BNSF and UP will have track capacity shortfalls on certain line segments by 2010, barring any major improvements, according to the 2002 "Los Angeles-Inland Empire Railroad Mainline Advance Planning Study." The data presented below assumes specific track capacity improvements and operational changes.

Proposed capacity improvement projects in the region would include:
- Freight railroad infrastructure (tracks, signals)
- Flying junctions
- Grade separations

Performance

Rail Volume Forecasts

The rail traffic forecast data used in the following analysis comes from the 2002 "Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", rather than from the forecast trains per day shown in Table 1 (which was based on the more recent information). The reason for using the 2002 study forecast here was that the 2002 study included analysis of future train performance delay, which is a key measure of train performance. No future train performance analysis was done relative to the forecast above. With this noted, the two volume forecasts are similar overall. It is reasonable, therefore, to assume that the two volume forecasts - given similar assumptions of mainline rail capacity and operating patterns - would generate similar performance.

Traffic on BNSF and UP track segments for the Year 2025 appears in Tables 2 and 3 below.

WSA's forecast assumed operating patterns on the UP similar to those assumed in the 2002 study's Alternative 1a, wherein Metrolink's Riverside Line trains remain on the LA Sub between Los Angeles and Pomona. To the consulting team's knowledge, Metrolink has no plans to shift Riverside Line trains to the Alhambra Line west of Pomona, as was assumed in the 2002 study's Alternative 1b.

Table 2
BNSF Peak-Day Rail Traffic for 2025 on the Los Angeles Inland Basin Rail Network
(Number of Trains per Day by Segment)

	Hobart-Fullerton	Fullerton-Atwood	Atwood-Riverside	Riverside-Colton
Year 2025 Total	**218**	**144**	**183**	**174**
BNSF through freight	112	112	121	121
Passenger	106	32	62	36
UP through freight	–	–	–	17

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.
Note: UP volume between Riverside and Colton on the BNSF was updated to 73 trains in the 2005 "Inland Empire Railroad Main Line Study Final Report", prepared for the Southern California Association of Governments (SCAG). Accordingly, total daily trains would reach 230 in 2025 on that segment.

Illustrative of the BNSF Transcon traffic increases forecasted from Year 2000 is the following. According to the 2002 study, there were 57 daily BNSF trains between Riverside and Colton in Year 2000. On the other hand, Table 2 shows that BNSF freight traffic at 121 daily trains on the same segment by 2025. That is, Table 2 BNSF train volumes equate to over a 100 percent increase on that segment. Considering UP and passenger train volumes (Amtrak and Metrolink), total daily trains will increase 69 percent, from 103 in 2000 to 174 in 2025 on the segment.

Table 3 represents a change in how the UP may operate its services in the future. That is, it may shift traffic around on the Los Angeles Subdivision and the Alhambra Line to gain operating flexibility. The daily number of flexible trains that may be routed along either line is forecasted at 92 by 2025.

Illustrative of the UP traffic increases forecasted from Year 2000 is the following. According to the 2002 study, there were 31 daily UP trains in East Los Angeles and Pomona on the LA Subdivision. Per Table 3, UP freight traffic could reach 106 daily trains on the same segment by 2025, depending on how UP decides to route trains. That is, Table 3 UP train volumes equate to more than a 240 percent increase on that segment. Considering UP and passenger train volumes (Metrolink), total daily trains will increase 230 percent, from 43 in 2000 to 142 in 2025 on the segment.

Table 3
UP Peak-Day Rail Traffic for 2025 on the Los Angeles Inland Basin Rail Network
(Number of Trains per Day by Segment)

Line	West of Pomona	Pomona-West Colton	West Colton-Colton
UP Alhambra Line			
UP through freight	13	17	27
Passenger	8	8	8

	West of Pomona	East of Pomona
UP Los Angeles Subdivision		
UP through freight	14	14
Passenger	36	36

Flexible Freight	92

	Through Pomona	Through Colton
Total UP Trains	161	176
UP through freight	117	132
Passenger	44	44

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.

Train Delay

Table 4 below shows average minutes of delay per train (under the two alternatives set forth in the 2002 "Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study"). One is the Status Quo Alternative, that is, the railroads run trains pretty much as they do today. The other is Alternative 1a, which assumed that UP will concentrate more freight traffic on a combination routing of the Los Angeles Subdivision between East Los Angeles and Pomona and the Alhambra Line between Pomona and Colton. This is the same assumption used in the Wilbur Smith Associates team forecast appearing in Table 1. The results (shown below in Table 4) indicate reductions in delay for trains of both railroads. The greatest change is for UP trains in Alternative 1a, with a reduction of about 38 percent. This result represents a decrease in average delay of 9 minutes per train.

Table 4
Freight Train Delay on the Los Angeles-Inland Empire Rail Network in 2025
(With Assumed Additional Tracks and Improvements)

Routing Option	Average Delay Per Train (minutes) 2025 Freight and Passenger
Status Quo	
BNSF Freight	30.6
UP Freight	23.7
Alternative 1a	
BNSF Freight	28.7
UP Freight	14.7

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.
Note: Assumed capacity improvements are those recommended in the aforementioned study. These appear in the following section.

The capacity improvements which enable the railroads to handle the increasing volume are described in the following section. Assuming no track and other improvements, an average delay of 206 minutes per BNSF train and 197 minutes per UP train would occur in 2010, according to the 2002 rail study. These figures compare with an average 32 minutes of delay per BNSF train and 30 minutes per UP train in 2000, as cited in the study. With capacity improvements cited in the study, delays in 2025 would be at or less than 2000 levels.

Improvements Assumed

The projected growth in freight and passenger railroad traffic can be accommodated provided certain capacity improvements are carried out on the rail lines. With a maximum capacity of 50 trains per day per line, both BNSF and UP will have track capacity shortfalls on certain line segments by 2010, barring any major improvements, according to the 2002 "Los Angeles-Inland Empire Railroad Mainline Advance Planning Study."

Proposed capacity improvement projects in the region would include:

- Freight railroad infrastructure (tracks, signals)
- Flying junctions
- Grade separations

The improvements recommended by the study and assumed for the two routing alternatives – the Status Quo Alternative and Alternative 1a for Year 2025 – are detailed in Table 5.

Table 5
Required Capacity Improvements 2025
for Routing Alternatives

Status Quo Alternative	
BNSF	4 main tracks, Hobart-Fullerton
	4 main tracks, Atwood-Colton
	3 main tracks, Atwood-Riverside
	Flying Junction at Riverside
	Grade separation of Colton Crossing
UP	2 main tracks, East LA-Pomona
	2 main tracks, LATC-Pomona
	Flying Junction of Palmdale Line at West Colton
	Flying Junction at Riverside
	Grade separation of Colton Crossing
BNSF Alternative 1a	
	4 main tracks, Hobart-Fullerton
	3 main tracks, Atwood-Colton
	Grade separation of Colton Crossing
UP Alternative 1a	
	3 main tracks, East LA-Pomona
	Flying Junction at Pomona
	Flying Junction of Palmdale Line at West Colton
	Grade separation of Colton Crossing

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.

The above stated improvements, according to the referenced study, are limited to the rail infrastructure required to physically handle the assumed train volumes. The Status Quo Alternative would require more track capacity improvements and more rail-grade separations than Alternative 1a; whereas Alternative 1a would have the added benefit of opening up the Alhambra Line for more Metrolink Service.

The 2002 rail study does not look at UP routes west of Los Angeles. At the same time, volume increases on these lines (the UP Coast Line and UP Santa Clarita Line), are not likely to be as great as on the BNSF and UP east-west Los Angeles basin lines.

1.4 CONCLUSION

On the MCGMAP study area rail lines, increased freight volumes combined with increased passenger rail service will lead to high volumes of rail movements on limited facilities. The 2005 "Inland Empire Railroad Main Line Study Final Report", a follow-up to the 2002 study and prepared for the Southern California Association of Governments (SCAG), forecasted 267 total

trains per day through Colton Crossing and 195 total trains per day through Cajon Pass[2]. Both the 2002 and 2005 studies forecasted well over 100 freight and passenger trains per day on BNSF and UP main lines east of Los Angeles (recognizing that UP can shift volumes between portions of the LA Subdivision and the Alhambra Line), as does the Wilbur Smith Associates team forecast in Table 1.

The analysis described above makes clear that, without additional rail capacity, the performance of the MCGMAP study area's rail system will face worsening congestion and delays.

2.1 HIGHWAY

Highway performance is directly related to the use of the highway system by various classes of users which include both passenger vehicles and commercial truck traffic.

This section presents information on system performance on the highway network within the SCAG region based on the travel forecasts prepared using the SCAG Draft 2030 Air Quality Management Plan (AQMP) Baseline model. Currently, over 54 million vehicle trips per day travel on the regional highway and arterial system[1]. The SCAG 2004 RTP reported that in the year 2000, total daily delay from congestion, for both personal travel and goods movement, was estimated at approximately 2.2 million person-hours throughout the SCAG region. The impact of delay on the freight industry is significant, and congestion and delay can increase the hourly cost of carrying goods by 50% to 250%, depending on the commodity[2].

The state highway system within the MCGMAP study area is shown in Figure 6.

2.2 TRUCK FORECASTS

The rapid growth of all vehicular traffic, increased congestion, and air quality impacts has caused a widespread recognition that the smooth and efficient movement of people and goods is essential for economic prosperity. For the highway system to operate efficiently in the future, it is important to project the volume of goods and vehicles in order to determine what the system will need to accommodate. Table 6 shows the forecast for truck and vehicle volumes and the volume-to-capacity ratio on the region's freeway system for the Year 2030. The volume-to-capacity ratios presented in the Table 6 are for daily traffic, and therefore may be lower than if the ratios were computed for peak-hour conditions. (Note: This information was also presented in Tech Memo 4a).

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Figure 6
EXISTING HIGHWAY SYSTEM WITHIN THE MCGMAP STUDY AREA
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Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-10	E	PCH to I-405	4,892	93,603	0.05	W	4,441	85,746	0.05
I-10	E	I-405 to I-110	8,161	161,698	0.05	W	8,814	157,124	0.06
I-10	E	I-110 to I-5	12,107	164,656	0.07	W	11,596	152,176	0.08
I-10	E	I-5 to I-710	7,475	127,320	0.06	W	8,997	123,820	0.07
I-10	E	I-710 to I-605	8,535	124,943	0.07	W	9,469	125,958	0.08
I-10	E	I-605 to SR-57	12,668	112,408	0.11	W	15,178	100,866	0.15
I-10	E	SR-57 to I-15	21,655	112,076	0.19	W	16,055	106,089	0.15
I-10	E	I-15 to I-215	10,154	92,981	0.01	W	12,902	101,491	0.13
I-101	N	I-5 to I-10	13,838	98,783	0.14	S	12,269	107,680	0.11
I-101	N	I-10 to I-110	18,466	170,571	0.11	S	15,274	172,289	0.09
I-101	N	I-110 to I-170	18,887	173,880	0.11	S	17,068	169,782	0.10
I-101	E	SR-170 to I-405	12,965	161,027	0.08	W	13,812	172,454	0.08
I-101	E	I-405 to SR-118	11,505	146,641	0.08	W	12,528	142,837	0.09
I-105	E	PCH to I-405	5,177	74,430	0.07	W	4,851	74,209	0.07
I-105	E	I-405 to I-110	8,590	101,566	0.08	W	9,127	108,082	0.08
I-105	E	I-110 to I-710	7,461	96,861	0.11	W	8,622	98,175	0.09
I-105	E	I-710 to I-605	16,227	107,924	0.15	W	11,725	76,125	0.14
I-110	N	Arroyo Pky to I-10	2,468	124,666	0.01	S	2,234	110,216	0.01
I-110	N	I-10 to I-105	14,837	140,430	0.11	S	14,810	140,743	0.11
I-110	N	I-105 to SR-91	14,124	131,181	0.11	S	13,250	117,533	0.11
I-110	N	SR-91 to I-405	18,580	152,002	0.12	S	12,938	106,930	0.12
I-110	N	I-405 to End	11,157	70,526	0.17	S	15,369	112,870	0.14
I-15	N	I-215 to SR-138	20,358	118,648	0.17	S	23,862	122,244	0.20
I-15	N	I-210 to I-215	16,346	86,213	0.19	S	19,794	87,284	0.23
I-15	N	I-10 to I-210	10,332	101,968	0.10	S	12,736	109,379	0.12

Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-15	N	SR-60 to I-10	10,572	116,444	0.09	S	9,656	116,419	0.08
I-15	N	SR-91 to SR-60	10,163	88,053	0.12	S	7,357	87,932	0.08
I-15	N	SR-74 to SR-91	14,194	91,554	0.16	S	7,899	92,669	0.09
I-210	N	SR-14 to SR-118	11,386	76,653	0.15	S	8,258	80,838	0.10
I-210	N	SR-118 to SR-2	15,319	96,870	0.16	S	11,614	93,249	0.13
I-210	N	SR-2 to SR-134	14,689	104,403	0.14	S	11,556	100,576	0.12
I-210	E	SR-134 to I-605	15,628	126,313	0.12	W	18,479	128,682	0.14
I-210	E	I-605 to SR-57	20,062	117,993	0.17	W	22,853	115,306	0.20
I-215	N	SR-30 to I-15	11,767	92,151	0.11	S	4,519	63,559	0.07
I-215	N	SR-60 to I-10	9,936	114,295	0.09	S	10,134	117,592	0.09
I-405	N	I-5 to SR-133	6,031	92,328	0.07	S	6,293	99,302	0.06
I-405	N	SR-133 to SR-55	8,112	127,991	0.06	S	7,909	125,564	0.06
I-405	N	SR-55 to SR-22	15,028	136,647	0.11	S	13,575	155,952	0.09
I-405	N	SR-22 to I-605	21,716	189,002	0.12	S	17,029	178,858	0.10
I-405	N	I-605 to I-710	14,906	133,948	0.11	S	13,286	132,289	0.10
I-405	N	I-710 to I-110	13,562	132,230	0.10	S	12,807	129,292	0.10
I-405	N	I-110 to SR-91	12,715	119,040	0.11	S	12,275	122,230	0.10
I-405	N	SR-91 to I-105	13,034	128,647	0.10	S	12,193	127,099	0.10
I-405	N	I-105 to I-10	14,374	149,354	0.10	S	13,445	152,610	0.09
I-405	N	I-10 to US-101	11,707	175,180	0.06	S	11,253	151,690	0.07
I-405	N	US-101 to I-5	7,410	142,371	0.05	S	6,463	126,201	0.05
I-5	N	LA County Line to I-605	23,321	138,101	0.17	S	17,868	147,832	0.12
I-5	N	I-605 to I-710	25,087	155,890	0.16	S	19,219	155,458	0.12
I-5	N	I-710 to SR-60	25,170	161,925	0.16	S	20,490	163,406	0.13
I-5	N	SR-60 to SR-134	16,674	142,956	0.12	S	14,180	142,724	0.10

Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-5	N	SR-134 to SR-118	14,311	127,149	0.11	S	12,655	132,547	0.10
I-5	N	SR-118 to SR-14	17,013	176,510	0.10	S	13,387	159,617	0.09
I-5	N	SR-57 to LA County Line	18,780	124,981	0.15	S	14,468	130,022	0.11
I-5	N	SR-55 to SR-57	17,521	156,485	0.11	S	16,369	178,949	0.09
I-5	N	SR-133 to SR-55	16,375	132,710	0.12	S	13,385	150,074	0.09
I-5	N	I-405 to SR-133	15,214	101,694	0.15	S	11,420	104,836	0.11
I-5	N	I-405 to SR-73	17,914	137,274	0.13	S	14,183	143,285	0.10
I-5	N	SR-73 to SD County Line	20,625	135,800	0.15	S	13,924	128,552	0.11
I-605	N	I-405 to SR-91	8,945	104,774	0.09	S	7,693	107,383	0.07
I-605	N	SR-91 to I-105	14,975	139,885	0.11	S	13,824	155,265	0.09
I-605	N	I-105 to I-5	20,128	127,720	0.16	S	17,378	124,879	0.14
I-605	N	I-5 to SR-60	21,148	115,071	0.19	S	20,827	112,813	0.19
I-605	N	SR-60 to I-10	17,174	111,544	0.15	S	17,223	101,262	0.17
I-605	N	I-10 to I-210	12,326	110,619	0.11	S	12,341	104,670	0.12
I-710	N	Port to I-405	17,414	52,166	0.27	S	21,203	63,072	0.29
I-710	N	I-405 to SR-91	34,058	109,758	0.32	S	33,541	103,070	0.33
I-710	N	SR-91 to I-105	25,983	123,616	0.22	S	25,162	134,410	0.19
I-710	N	I-105 to I-5	17,122	125,845	0.14	S	16,258	118,899	0.14
I-710	N	I-5 to SR-60	10,860	112,673	0.10	S	8,730	110,882	0.08
I-710	N	SR-60 to I-10	9,452	100,495	0.09	S	7,245	99,333	0.07
I-710	N	I-10 to I-210	8,542	101,782	0.08	S	6,862	93,596	0.07
SR-134	E	I-5 to I-210	9,048	113,085	0.08	W	9,318	108,779	0.09
SR-134	E	I-101 to I-5	9,048	113,085	0.08	W	9,207	110,503	0.08
SR-55	N	I-405 to I-5	7,367	120,962	0.06	S	6,492	116,644	0.05
SR-55	N	I-5 to SR-22	7,726	112,372	0.07	S	7,226	113,268	0.06
SR-55	N	SR-22 to SR-91	9,162	124,028	0.07	S	8,326	115,820	0.07
SR-57	N	I-5 / SR-22 to SR-91	10,256	121,293	0.08	S	9,144	124,719	0.07

Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
SR-57	N	SR-91 to SR-60	11,493	131,438	0.09	S	10,510	120,647	0.09
SR-57	N	SR-60 to I-10	6,280	102,101	0.06	S	7,811	99,983	0.08
SR-57	N	I-210 to SR-30	11,290	108,540	0.11	S	9,006	109,449	0.08
SR-60	E	I-10 to I-710	10,164	140,256	0.07	W	11,131	137,489	0.08
SR-60	E	I-710 to I-605	11,592	141,498	0.08	W	13,617	141,754	0.10
SR-60	E	I-605 to SR-57	12,512	118,998	0.11	W	13,662	117,793	0.12
SR-60	E	SR-57 to I-15	12,740	114,780	0.11	W	14,894	114,299	0.13
SR-60	E	I-15 to I-215	8,796	109,776	0.08	W	10,948	105,513	0.10
SR-91	E	I-10 to I-710	11,319	111,032	0.10	W	10,255	104,307	0.10
SR-91	E	I-710 to I-605	19,626	123,286	0.16	W	20,563	129,334	0.16
SR-91	E	I-605 to I-5	18,602	114,163	0.16	W	19,186	122,910	0.16
SR-91	E	I-5 to SR-57	17,162	116,260	0.15	W	21,863	127,617	0.17
SR-91	E	SR-57 to SR-241	16,481	136,712	0.12	W	19,578	138,493	0.14
SR-91	E	SR-241 to I-15	22,131	159,292	0.14	W	26,023	165,959	0.16
SR-91	E	I-15 to I-215	11,310	96,782	0.12	W	13,009	102,837	0.13
SR-118	E	I-405 to SR-23	5,794	98,698	0.06	W	7,606	108,516	0.07
SR-170	E	I-5 to SR-134	12,193	127,895	0.10	W	9,813	129,345	0.08

Note: D – Direction
N – North
S – South
E – East
W – West

Source: SCAG 2030 Draft AQMP Baseline model, SCAG, April 2006.

Table 7 shows the increase in volume of trucks from the Years 2003 to 2030 on selected segments of the highway system. These segments were selected based on potential routes for truck improvements described and evaluated as part of Task 6.

Table 7
Daily Truck Volumes, Year 2003 and 2030
On Selected Highway Segments

Name	Segments	SCAG Model TRUCK 2003	SCAG Model Truck 2030	Percent Change in Daily Truck Volume
I-10	PCH to I-405	7,465	9,333	25%
I-10	I-405 to I-110	14,402	16,975	18%
I-10	I-110 to I-5	19,057	23,703	24%
I-10	I-5 to I-710	12,208	16,472	35%
I-10	I-710 to I-605	12,209	18,004	47%
I-10	I-605 to SR-57	16,484	27,847	69%
I-10	SR-57 to I-15	21,003	37,710	80%
I-10	I-15 to I-215	13,112	23,056	76%
I-15	I-215 to SR-138	19,690	44,220	125%
I-15	I-210 to I-215	15,487	36,140	133%
I-15	I-10 to I-210	11,779	23,068	96%
I-15	SR-60 to I-10	11,912	20,228	70%
I-15	SR-91 to SR-60	10,666	17,519	64%
I-15	SR-74 to SR-91	11,009	22,093	101%
I-5	SR-118 to SR-14	17,336	30,399	75%
I-5	SR-134 to SR-118	16,882	26,966	60%
I-5	SR-60 to SR-134	23,892	30,854	29%
I-5	I-710 to SR-60	34,037	45,660	34%
I-5	I-605 to I-710	31,621	44,306	40%
I-5	LA County Line to I-605	26,972	41,189	53%
I-5	SR-57 to LA County Line	22,144	33,248	50%
I-5	SR-55 to SR-57	24,184	33,890	40%
I-5	SR-133 to SR-55	19,633	29,760	52%
I-5	I-405 to SR-133	16,120	26,635	65%
I-5	SR-73 to I-405	18,485	32,096	74%
I-5	San Diego County Line to SR-73	15,947	34,549	117%
I-605	I-405 to SR- 91	11,945	16,638	39%
I-605	SR-91 to I-105	20,969	28,798	37%
I-605	I-105 to I-5	24,521	37,506	53%
I-605	I-5 to SR-60	25,925	41,975	62%
I-605	SR-60 to I-10	20,414	34,397	68%
I-605	I-10 to I-210	13,933	24,667	77%
I-710	Port to I-405	25,173	46,543	85%
I-710	I-405 to SR- 91	34,564	67,599	96%
I-710	SR-91 to I-105	29,634	51,145	73%
I-710	I-105 to I-5	22,323	33,381	50%
I-710	I-5 to SR-60	12,403	19,590	58%
I-710	SR-60 to I-10	8,344	16,697	100%
I-710	I-10 to I-210	8,022	15,404	92%
SR-57	I-5 / SR-22 to SR-91	14,060	19,400	38%
SR-57	SR-91 to SR-60	16,434	22,003	34%

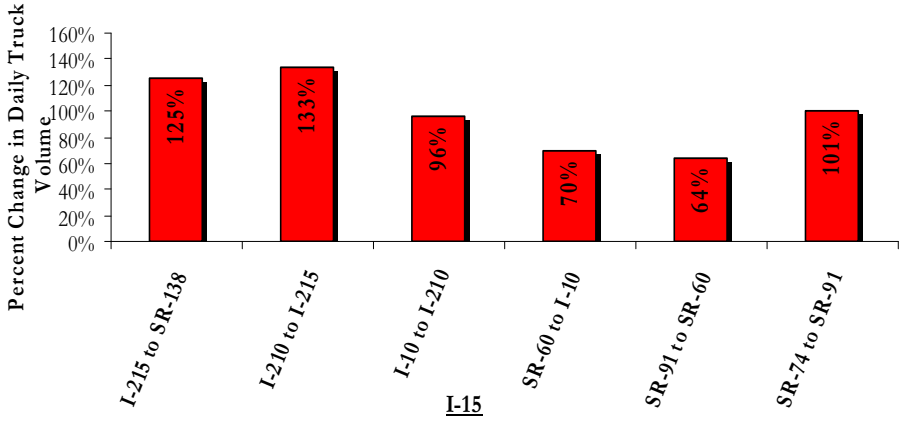
Name	Segments	SCAG Model TRUCK 2003	SCAG Model Truck 2030	Percent Change in Daily Truck Volume
SR-57	SR-60 to I-10	8,914	14,091	58%
SR-57	I-10 to I-210	11,753	18,447	57%
SR-60	I-10 to I-710	17,321	21,294	23%
SR-60	I-710 to I-605	18,907	25,209	33%
SR-60	I-605 to SR-57	19,415	26,174	35%
SR-60	SR-57 to I-15	19,548	27,634	41%
SR-60	I-15 to I-215	11,117	19,744	78%
SR-91	I-110 to I-710	14,774	21,574	46%
SR-91	I-710 to I-605	23,017	40,189	75%
SR-91	I-605 to I-5	20,162	37,788	87%
SR-91	I-5 to SR-57	20,397	39,025	91%
SR-91	SR-57 to SR-241	18,613	36,060	94%
SR-91	SR-241 to I-15	22,320	48,154	116%
SR-91	I-15 to I-215	11,449	24,319	112%

Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

The forecast shown above indicates the following:

- I-15 will experience significant increase in truck volumes between I-210 to the SR-138 from 15,000 to 44,000 by 2030 and between SR-74 and SR-91 from 11,000 to 22,093, an increase of more than 130% and 100% percent, respectively, when compared to 2003 (as shown in Figure 7)

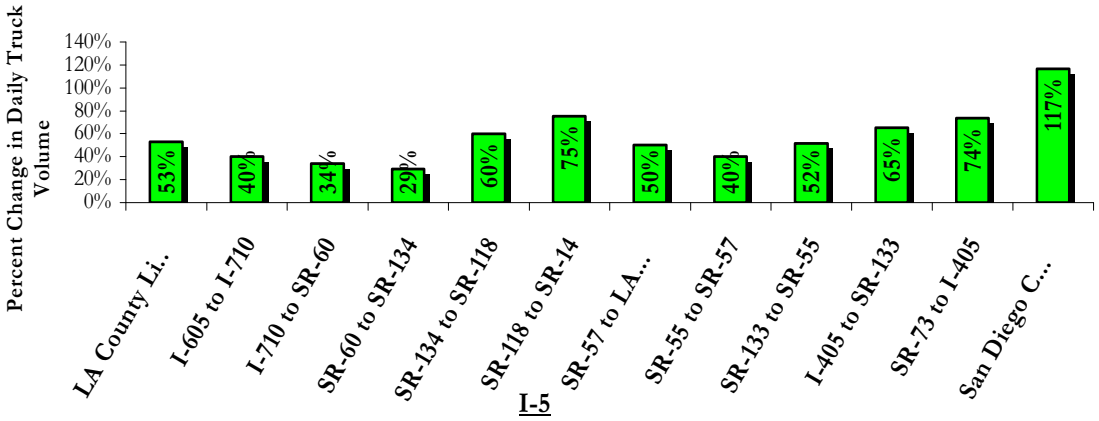
Figure 7
Percentage Change in Daily Truck Volumes on I-15 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- The daily truck volumes on I-5 between SR-73 and San Diego County show an increase of more than 100% from a little more than 15,000 in 2003 to about 34,000 by 2030 as shown in Figure 8.

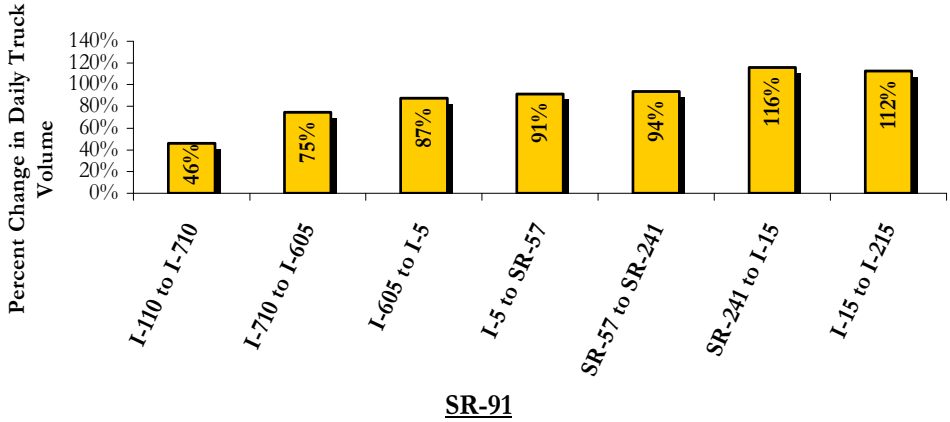
Figure 8
Percentage Change in Daily Truck Volumes on I-5 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- Truck volumes on SR- 91 between I-5 and I-15 escalate from 11,000 to more than 48,000 by 2030, an increase more than 110% as shown below.

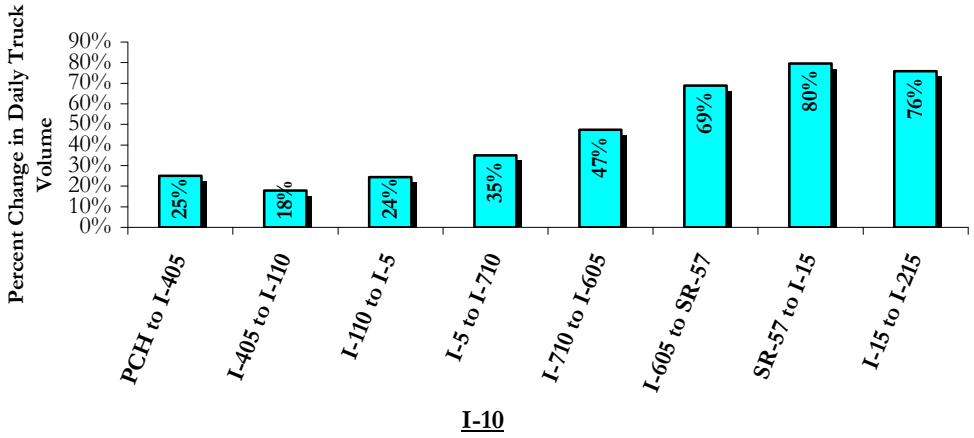
Figure 9
Percentage Change in Daily Truck Volumes on SR-91 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- I-10 from SR-57 to I-215 shows an increase from 13,000 to 37,000 by 2030, an approximately 80% increase in daily volume (shown in Figure 10).

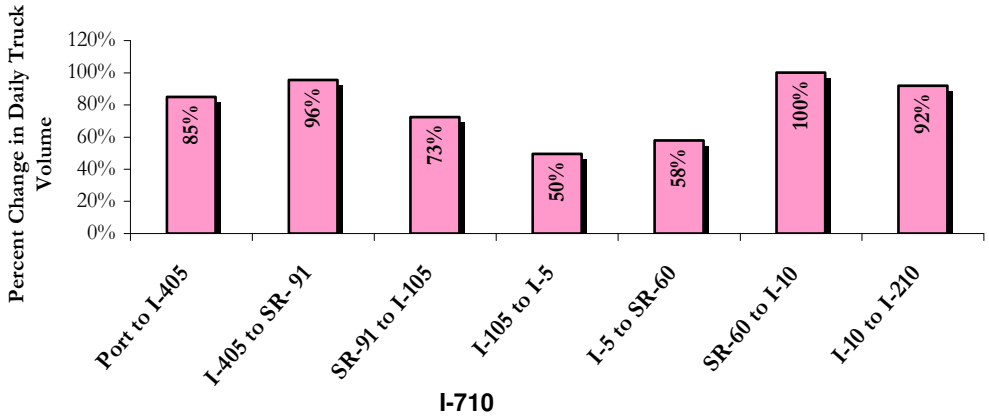
Figure 10
Percentage Change in Daily Truck Volumes on I-10 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- The daily Truck volumes on I-710 between SR-60 to I-10 show an increase of 100% from 8,000 to more than 15,000 by 2030 as indicated in Figure 11.

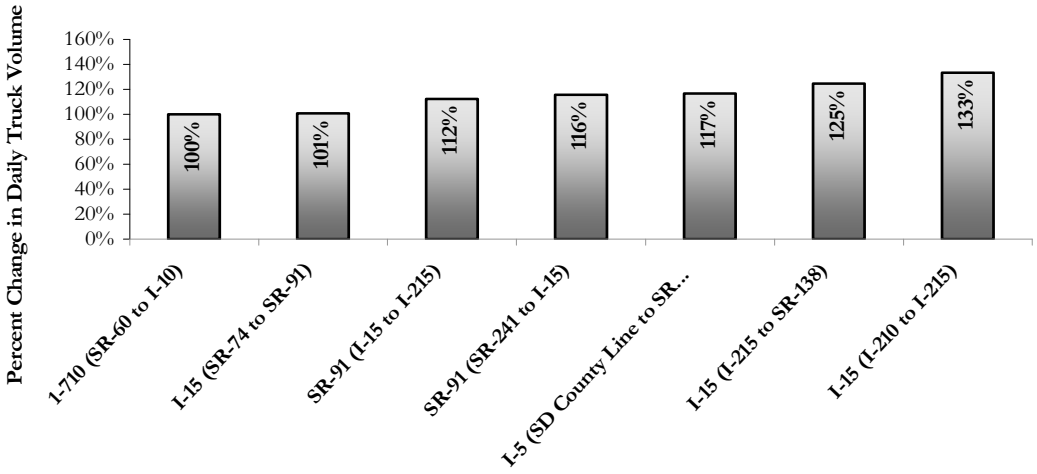
Figure 11
Percentage Change in Daily Truck Volumes on I-710 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- Truck volumes on I-710 between I-10 and I-210 increase from 8,000 to 15,000 by 2030, an increase more than 90%, due to the assumed extension of I-710 by 2030. Currently, I-710 ends at Valley Blvd. (just north of I-10 in Alhambra). In 2030, I-710 is assumed to continue through to I-210.
- I-605 from I-10 to I-210 escalate from 13,000 to more than 24,000 by 2030, an increase of 70% in daily truck and volumes on SR-60 from I-15 to I-215 shows an increase more than 75% than the 2003 truck volumes.
- The daily truck volumes on SR-57 between SR-60 to I-210 show an increase of more than 55% from 11,000 to 18,000 by 2030.
- Figure 12 presents more than 100% change from 2003 to 2030 for all the freeways on Table 7. As shown in Figure 12, I-15 with more than 130 percent increase has highest growth by 2030.

Figure 12
100 Percent or more Change in Daily Truck Volumes



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

2.3 SYSTEM PERFORMANCE

Performance Measure

As reported in previous Tech Memos, truck travel patterns are different from private vehicle travel patterns; and must be analyzed separately in order to determine their impact on the highway system. Highway capacity-related performance measures include truck volumes, average speed, and volume-to-capacity ratios. These performance measures are estimated for the Year 2030 as shown in Figures 13 through 21.

Performance

Truck volumes

The truck traffic volumes for the Year 2030 are the average daily trips made by trucks on links on the highway network. The volumes presented are unadjusted model-based results. These daily volumes are useful for planning purposes and for estimating the increase in volumes of freight traffic on the highways. Figure 13 shows the average daily truck traffic on highway links for the Year 2030.

Volume-to-capacity ratio

A critical factor in highway capacity analysis is the proportion of the facility's capacity being utilized by traffic. This ratio is often used as a measure of sufficiency of existing or proposed facility capacity. In forecasting situations, a volume-to-capacity (v/c) ratio above 1.00 predicts that the demand will exceed the available capacity, leading to delays, queues, and congestion. The v/c ratios for the Year 2030 have been combined with the study area's highway network and are plotted thematically, allowing visual representation of congested segments of the highway. Figures 14 through 17 show highway link v/c ratios for the AM peak, PM peak, nighttime (off-peak) and midday time periods.

Average Speed

The travel time delay on the highway is calculated as the difference between the congested travel time and the free flow travel time. The average speed of truck travel is the length (distance traveled) divided by the congested travel time. Figures 18 through 21 show the average speed on the region's highway system for the Year 2030 during the AM and PM peak hours, nighttime and midday.

0
1 - 7409
7410 - 11632
11633 - 15561
15562 - 36515

Water
Urban Areas
County Boundary
Other Highways
Ports
Airports

Year 2030 System Performance

Forecast ADT on SCAG Region Highways
Trucks

0 5 10 20 30 40 Miles

10/18/06

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast V/C Ratios on SCAG Region Highways
AM Peak

0 5 10 20 30 40 Miles

10/18/06

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

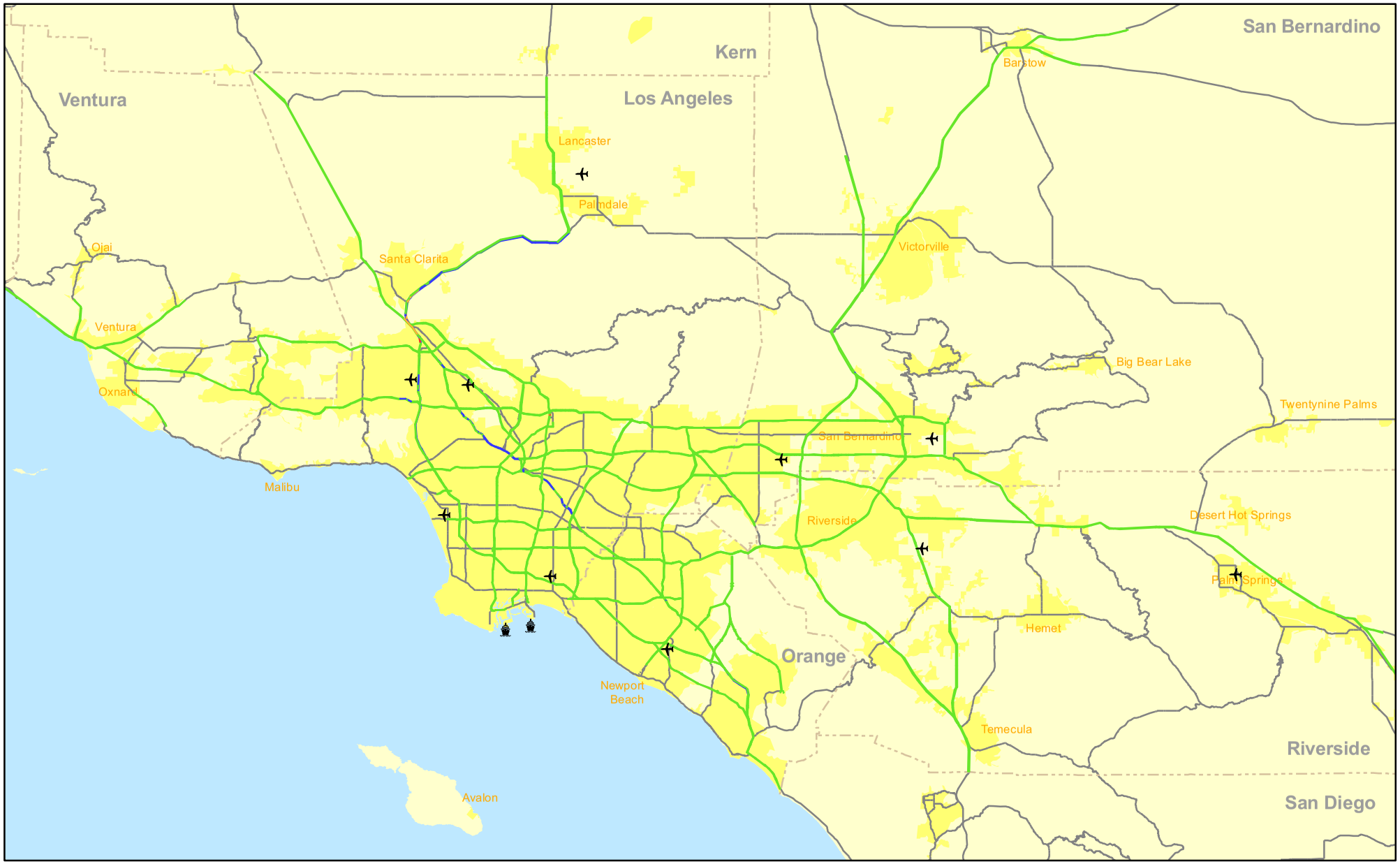
Forecast V/C Ratios on SCAG Region Highways
PM Peak

0 5 10 20 30 40 Miles

10/18/06

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast V/C Ratios on SCAG Region Highways
Night Time

0 5 10 20 30 40 Miles

10/18/06

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Year 2030 System Performance

Forecast V/C Ratios on SCAG Region Highways
Mid Day

VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

0 5 10 20 30 40 Miles

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06

Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

AM Peak

0 5 10 20 30 40 Miles

10/18/06

WilburSmith ASSOCIATES — ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

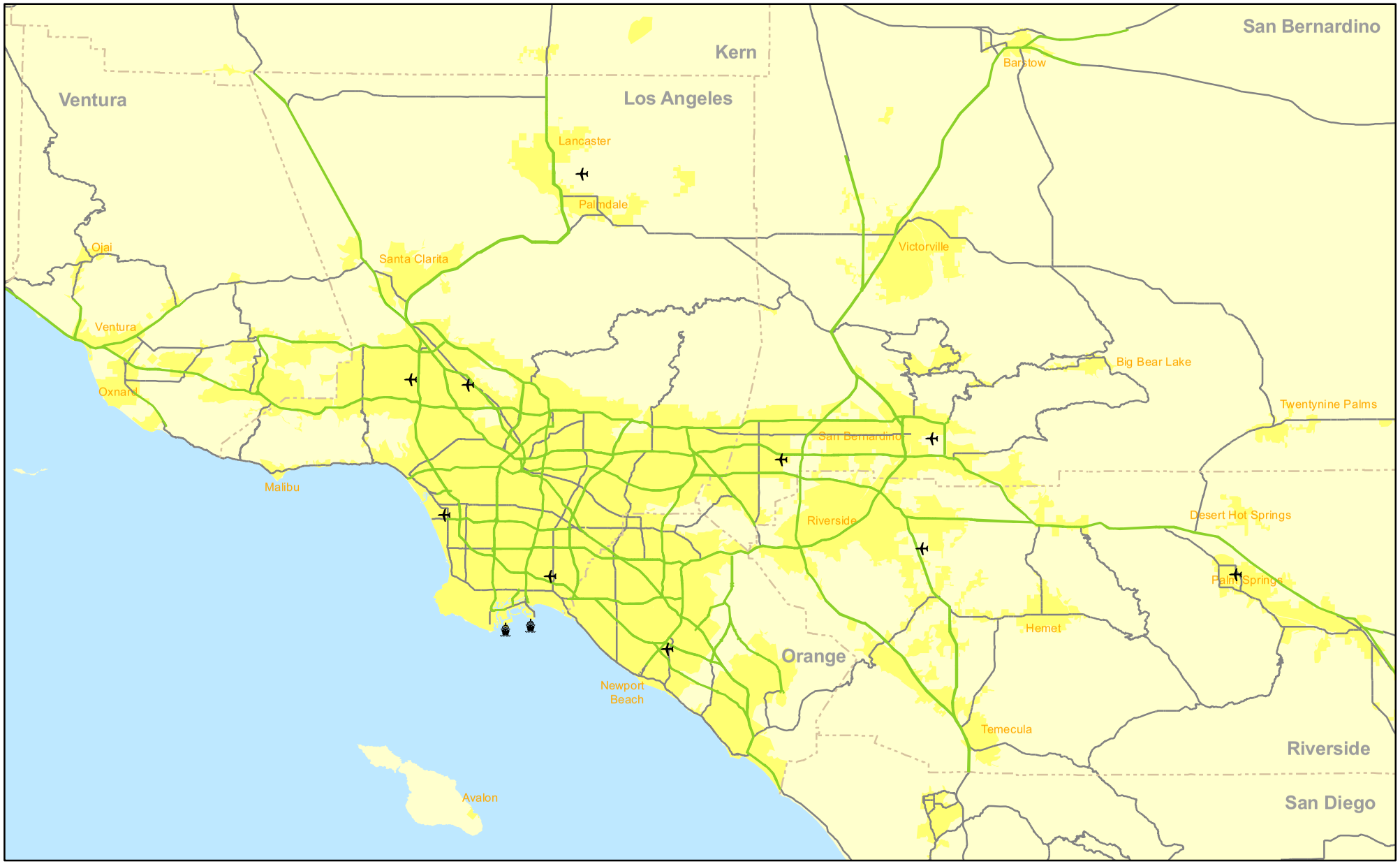
PM Peak

0 5 10 20 30 40 Miles

10/18/06

WilburSmith ASSOCIATES — ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

Night Time

0 5 10 20 30 40 Miles

10/18/06

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

Mid Day

0 5 10 20 30 40 Miles

10/18/06

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Figures 13 through 21 provide relevant information related to the future performance of the MCGMAP Region's highway system. For instance:

Figure 13 shows substantial truck volumes on significant portions of SR-60, US-101, I-110, I-405, I-5, I-710, SR-91, I-605, I-10, I-15, and I-210. The high volumes, in combination with the port access I-710, does indicate a high level of truck traffic moving into, through, and out of the region.

Figures 14 and 15 show the mobility problems that occur on the highway system during peak hours. The high volume to capacity ratios are concentrated in areas that currently and will continue to be the major connectors between residential areas and employment centers showing a clear concentration around downtown Los Angeles.

The night time volumes do not approach the high level of congestion when compared to the peak hour volumes as shown in Figure 16. The volumes at the intersection of I-405, SR-14 and I-5 demonstrate that the system is exhibiting areas of congestion during night time. The relatively high volumes on I-5 through the core of Los Angeles county are also noteworthy.

The ratios shown in Figure 17, in conjunction with the AM and PM peak figures demonstrate that much of the freeway network is forecast to be congested all day. There is no congestion relief except at night.

Figure 18 through Figure 21 show similar patterns and would lead to the same observations as above. Figure 18 shows the speed forecast on the freeway system during AM peak hours similar to Figures 14 indicating lower speeds on certain segments of I-5, I-15, I-215, I-405, SR-14 and near downtown LA. Figure 19 indicates lower speeds during PM peak hours on greater segments of the freeway when compared to the AM peak hours. Mid day traffic experiences lower speeds at major freeway intersections like the I-5, SR-14 and around downtown LA, near the port, and on some segments of I-405 and I-10 as shown in Figure 21.

For this study, we also looked at the truck volumes on the region's highway system as shown in Table 8 below. The table below helps determine the potential differences in future forecast volumes due to changes in existing volumes.

Table 8
Truck Volumes
Post-Processed Model Runs

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
I-10	END to I-405	89,020	79,638	3,898	3,567	93,603	85,746	4,892	4,441	129,842	116,158	3,096	2,833	134,425	122,266	4,089	3,707
I-10	I-405 to I-110	158,234	156,011	7,016	7,386	161,698	157,124	8,161	8,814	132,934	131,066	5,183	5,456	136,398	132,179	6,328	6,884
I-10	I-110 to I-5	162,588	150,750	9,894	9,164	164,656	152,176	12,107	11,596	170,196	157,804	6,862	6,356	172,264	159,231	9,076	8,788
I-10	I-5 to I-710	126,123	113,835	5,883	6,325	127,320	123,820	7,475	8,997	117,210	105,790	3,868	4,160	118,406	115,775	5,461	6,831
I-10	I-710 to I-605	117,773	118,574	5,808	6,401	124,943	125,958	8,535	9,469	112,118	112,882	6,498	7,160	119,289	120,265	9,225	10,228
I-10	I-605 to SR-57	112,068	96,713	7,705	8,779	112,408	100,866	12,668	15,178	113,259	97,741	7,900	9,001	113,599	101,894	12,863	15,400
I-10	SR-57 to I-15	100,975	96,682	11,507	9,496	112,076	106,089	21,655	16,055	127,204	121,796	9,863	8,140	138,304	131,203	20,011	14,699
I-10	I-15 to I-215	84,223	88,534	6,062	7,050	92,981	101,491	10,154	12,902	95,067	99,933	10,007	11,638	103,825	112,890	14,099	17,490
I-101	I-5 to I-10	92,455	105,929	9,094	10,432	98,783	107,680	13,838	12,269	101,596	116,404	4,000	4,589	107,924	118,154	8,745	6,426
I-101	I-10 to I-110	155,865	162,320	11,985	12,584	170,571	172,289	18,466	15,274	134,221	139,779	5,560	5,838	148,926	149,748	12,041	8,528
I-101	I-110 to I-170	160,706	159,682	12,531	13,177	173,880	169,782	18,887	17,068	146,467	145,533	3,772	3,966	159,640	155,634	10,128	7,858
I-101	SR-170 to I-405	153,939	157,843	9,624	9,314	161,027	172,454	12,965	13,812	144,171	147,829	3,932	3,806	151,260	162,439	7,273	8,303
I-101	I-405 to SR-118	137,450	136,630	8,439	9,313	146,641	142,837	11,505	12,528	123,870	123,130	4,885	5,390	133,061	129,338	7,950	8,605
I-105	END to I-405	69,097	68,947	4,696	4,183	74,430	74,209	5,177	4,851	98,607	98,393	5,928	5,281	103,940	103,654	6,410	5,949
I-105	I-405 to I-110	100,426	105,619	7,143	7,415	101,566	108,082	8,590	9,127	96,017	100,983	5,500	5,709	97,158	103,446	6,947	7,421
I-105	I-110 to I-710	95,741	96,725	6,448	6,303	96,861	98,175	7,461	8,622	102,971	104,029	8,782	8,585	104,091	105,480	9,795	10,904
I-105	I-710 to I-605	106,388	96,721	9,345	8,899	107,924	76,125	16,227	11,725	102,664	93,336	8,885	8,260	104,200	72,739	15,767	11,086
I-110	End to I-10	115,088	104,355	1,891	1,649	124,666	110,216	2,468	2,234	24,387	22,113	241	210	33,966	27,974	817	795
I-110	I-10 to I-105	141,289	140,496	11,123	10,797	140,430	140,743	14,837	14,810	146,411	145,589	7,808	7,580	145,551	145,836	11,522	11,593
I-110	I-105 to SR-91	128,871	114,127	9,398	8,718	131,181	117,533	14,124	13,250	165,466	146,534	8,595	7,972	167,776	149,941	13,320	12,504
I-110	SR-91 to I-405	151,400	103,660	11,578	7,885	152,002	106,930	18,580	12,938	141,867	97,133	11,175	7,610	142,469	100,403	18,177	12,664
I-110	I-405 to End	68,729	108,352	6,342	8,879	70,526	112,870	11,157	15,369	71,803	113,197	4,594	6,432	73,599	117,715	9,409	12,922
I-15	I-215 to SR-138	69,556	72,481	8,305	11,385	118,648	122,244	20,358	23,862	62,192	64,808	8,035	11,015	111,285	114,571	20,088	23,492
I-15	I-210 to I-215	68,173	63,568	7,045	8,442	86,213	87,284	16,346	19,794	86,936	81,064	7,871	9,433	104,976	104,780	17,173	20,785
I-15	I-10 to I-210	70,923	79,047	4,805	6,973	101,968	109,379	10,332	12,736	94,583	105,417	8,404	12,196	125,628	135,749	13,931	17,959

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
I-15	SR-60 to I-10	87,930	94,711	5,647	6,266	116,444	116,419	10,572	9,656	105,434	113,566	8,512	9,446	133,949	135,273	13,438	12,836
I-15	SR-91 to SR-60	71,645	70,965	5,897	4,769	88,053	87,932	10,163	7,357	89,424	88,576	5,521	4,465	105,832	105,543	9,787	7,053
I-15	SR-74 to SR-91	61,412	60,276	6,555	4,454	91,554	92,669	14,194	7,899	89,831	88,169	5,946	4,040	119,973	120,562	13,584	7,485
I-210	SR-14 to SR-118	87,260	83,252	7,605	6,863	76,653	80,838	11,386	8,258	71,646	68,354	4,982	4,496	61,039	65,941	8,764	5,892
I-210	SR-118 to SR-2	51,536	55,050	6,733	7,469	96,870	93,249	15,319	11,614	83,649	89,351	5,253	4,798	128,983	127,551	15,068	11,385
I-210	SR-2 to SR-134	100,696	81,716	8,842	6,347	104,403	100,576	14,689	11,556	169,472	156,695	9,383	6,735	173,179	175,556	15,230	11,944
I-210	SR-134 to I-605	119,858	124,954	9,605	10,555	126,313	128,682	15,628	18,479	150,305	156,695	7,679	8,439	156,759	160,423	13,702	16,362
I-210	I-605 to SR-57	118,845	108,930	10,458	10,506	117,993	115,306	20,062	22,853	87,135	79,865	3,432	3,448	86,283	86,242	13,036	15,794
I-215	SR-30 to I-15	56,308	39,694	5,116	2,874	92,151	63,559	11,767	4,519	28,740	20,260	2,880	1,618	64,583	44,125	9,531	3,263
I-215	SR-60 to I-10	85,779	90,243	3,843	4,350	114,295	117,592	9,936	10,134	52,631	55,369	5,167	5,849	81,146	82,719	11,260	11,634
I-405	I-5 to SR-133	80,777	87,835	3,779	4,147	92,328	99,302	6,031	6,293	107,791	117,209	4,581	5,027	119,342	128,676	6,833	7,173
I-405	SR-133 to SR-55	108,263	107,752	5,244	5,225	127,991	125,564	8,112	7,909	115,773	115,227	6,827	6,802	135,501	133,039	9,695	9,487
I-405	SR-55 to SR-22	120,979	125,678	9,054	8,909	136,647	155,952	15,028	13,575	135,371	140,629	4,174	4,106	151,039	170,904	10,147	8,772
I-405	SR-22 to I-605	194,751	155,908	15,287	11,736	189,002	178,858	21,716	17,029	159,396	127,604	5,423	4,163	153,646	150,554	11,852	9,456
I-405	I-605 to I-710	128,832	149,856	10,233	16,579	133,948	132,289	14,906	13,286	148,854	173,146	5,431	4,169	153,970	155,578	10,104	876
I-405	I-710 to I-110	125,445	124,707	9,303	9,577	132,230	129,292	13,562	12,807	145,428	144,572	6,032	8,017	152,213	149,157	10,290	11,247
I-405	I-110 to SR-91	115,206	117,939	9,569	9,766	119,040	122,230	12,715	12,275	123,535	126,465	5,729	5,846	127,369	130,756	8,874	8,356
I-405	SR-91 to I-105	120,201	119,610	9,913	9,651	128,647	127,099	13,034	12,193	148,964	148,432	6,039	5,860	157,411	155,921	9,160	8,402
I-405	I-105 to I-10	151,963	154,953	10,748	10,393	149,354	152,610	14,374	13,445	145,568	130,933	6,326	5,839	142,959	128,590	9,952	8,892
I-405	I-10 to US-101	172,148	138,225	10,792	9,472	175,180	151,690	11,707	11,253	159,739	128,261	6,933	6,085	162,770	141,726	7,847	7,866
I-405	US-101 to End	115,335	101,563	6,037	5,442	142,371	126,201	7,410	6,463	120,707	106,293	4,572	4,122	147,742	130,931	5,945	5,143
I-5	LA County Line to I-605	111,312	120,312	14,239	12,732	138,101	147,832	23,321	17,868	112,934	122,066	10,906	9,751	139,723	149,585	19,987	14,887
I-5	I-605 to I-710	149,856	148,586	16,579	15,042	155,890	155,458	25,087	19,219	117,498	116,502	11,042	10,018	123,531	123,374	19,550	14,196
I-5	I-710 to SR-60	164,863	156,772	18,008	16,029	161,925	163,406	25,170	20,490	135,321	128,679	10,643	9,474	132,383	135,313	17,806	13,935
I-5	SR-60 to SR-134	140,432	136,503	12,955	10,938	142,956	142,724	16,674	14,180	147,565	143,435	9,751	8,233	150,088	149,657	13,470	11,475
I-5	SR-134 to SR-118	112,371	118,350	8,726	8,157	127,149	132,547	14,311	12,655	93,512	98,488	8,475	7,922	108,290	112,685	14,060	12,420
I-5	SR-118 to SR-14	112,517	114,320	8,665	8,672	176,510	159,617	17,013	13,387	67,459	68,541	6,016	6,020	131,453	113,838	14,364	10,736
I-5	SR-57 to LA County Line	109,636	118,447	11,547	10,597	124,981	130,022	18,780	14,468	124,978	135,022	9,490	8,710	140,323	146,597	16,723	12,581
I-5	SR-55 to SR-57	153,773	167,544	11,823	12,360	156,485	178,949	17,521	16,369	164,628	179,372	10,764	11,252	167,340	190,777	16,461	15,261
I-5	SR-133 to SR-55	124,574	129,306	10,663	8,970	132,710	150,074	16,375	13,385	168,794	175,206	11,957	10,059	176,930	195,974	17,669	14,474
I-5	I-405 to SR-133	88,975	89,909	8,806	7,315	101,694	104,836	15,214	11,420	126,834	129,042	8,135	6,757	139,554	143,970	14,543	10,863
I-5	SR-73 to I-405	116,230	119,076	9,968	8,517	137,274	143,285	17,914	14,183	138,307	136,785	5,151	4,334	159,351	160,993	13,097	10,000

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
I-5	End to SR-73	99,400	94,937	8,929	7,018	135,800	128,552	20,625	13,924	111,503	110,853	5,188	4,269	147,903	144,467	16,884	11,175
I-605	I-405 to SR- 91	106,246	109,920	5,956	5,989	104,774	107,383	8,945	7,693	91,911	95,089	4,317	4,341	90,438	92,552	7,305	6,045
I-605	SR-91 to I-105	140,068	153,396	10,384	10,586	139,885	155,265	14,975	13,824	117,891	129,109	5,663	5,773	117,709	130,979	10,254	9,011
I-605	I-105 to I-5	132,359	127,821	12,553	11,968	127,720	124,879	20,128	17,378	156,686	151,314	10,848	10,671	152,047	148,372	18,423	16,081
I-605	I-5 to SR-60	117,730	116,740	12,869	13,056	115,071	112,813	21,148	20,827	95,903	95,097	11,548	11,716	93,244	91,169	19,827	19,487
I-605	SR-60 to I-10	123,063	102,452	10,741	9,673	111,544	101,262	17,174	17,223	126,056	104,944	14,549	13,102	114,537	103,754	20,982	20,652
I-605	I-10 to End	111,737	106,028	7,112	6,820	110,619	104,670	12,326	12,341	85,689	81,311	9,898	9,491	84,572	79,953	15,111	15,012
I-710	End to I-405	59,642	62,031	12,457	12,716	63,462	65,697	23,431	23,112	87,253	90,747	12,931	13,199	91,073	94,413	23,905	23,595
I-710	I-405 to SR- 91	105,662	102,817	17,653	16,911	109,758	103,070	34,058	33,541	110,487	107,513	19,351	18,537	114,584	107,766	35,756	35,167
I-710	SR-91 to I-105	118,205	130,174	14,494	15,140	123,616	134,410	25,983	25,162	117,549	129,451	18,719	19,553	122,959	133,687	30,207	29,575
I-710	I-105 to I-5	118,877	113,452	11,162	11,161	125,845	118,899	17,122	16,258	84,235	86,434	11,745	11,743	91,203	91,881	17,705	16,841
I-710	I-5 to SR-60	94,419	100,611	6,079	6,324	112,673	110,882	10,860	8,730	64,389	68,611	5,512	5,873	82,642	78,883	10,293	8,279
I-710	SR-60 to I-10	64,243	77,559	4,093	4,251	100,495	99,333	9,452	7,245	60,255	72,745	5,158	6,227	96,507	94,519	10,517	9,221
I-710	I-10 to End	20,008	93,596	1,160	6,862	101,782	93,596	8,542	6,862	12,152	56,848	216	1,281	93,926	56,848	7,599	1,281
SR-134	I-5 to I-210	110,647	100,727	6,166	5,378	113,085	108,779	9,048	9,318	111,498	101,502	2,988	2,720	113,936	109,554	5,870	6,660
SR-134	I-101 to I-5	107,441	107,770	5,832	6,197	113,085	110,503	9,048	9,207	106,337	106,663	2,850	2,858	111,981	109,395	6,066	5,869
SR-55	I-405 to I-5	111,464	111,129	5,604	5,250	120,962	116,644	7,367	6,492	120,180	119,820	7,186	6,734	129,678	125,334	8,950	7,975
SR-55	I-5 to SR-22	100,916	100,386	5,255	5,187	112,372	113,268	7,726	7,226	128,839	128,161	7,631	7,532	140,294	141,044	10,102	9,572
SR-55	SR-22 to END	110,828	105,998	6,385	5,914	124,028	115,820	9,162	8,326	131,362	125,638	7,872	7,291	144,562	135,459	10,649	9,703
SR-57	I-5 / SR-22 to SR-91	103,533	114,195	6,835	7,226	121,293	124,719	10,256	9,144	104,614	115,386	7,272	7,688	122,374	125,911	10,693	9,606
SR-57	SR-91 to SR-60	117,333	114,244	8,381	8,052	131,438	120,647	11,493	10,510	152,001	147,999	10,404	9,996	166,106	154,402	13,516	12,454
SR-57	SR-60 to I-10	97,306	94,313	4,496	4,418	102,101	99,983	6,280	7,811	86,835	84,165	4,718	4,636	91,631	89,834	6,502	8,029
SR-57	I-10 to I-210	87,575	89,073	5,808	5,925	108,540	109,449	10,069	8,378	112,538	114,462	7,967	8,127	133,502	134,838	12,228	10,580
SR-60	End to I-710	143,281	140,374	8,718	8,603	140,256	137,489	10,164	11,131	106,076	103,924	5,116	5,048	103,051	101,038	6,562	7,576
SR-60	I-710 to I-605	138,427	139,395	8,875	10,032	141,498	141,754	11,592	13,617	120,080	120,920	7,546	8,529	123,151	123,279	10,262	12,115
SR-60	I-605 to SR-57	111,748	116,484	9,025	10,390	118,998	117,793	12,512	13,662	104,779	109,221	9,202	10,593	112,030	110,529	12,688	13,866
SR-60	SR-57 to I-15	96,384	104,333	8,650	10,898	114,780	114,299	12,740	14,894	108,524	117,476	10,771	13,569	126,921	127,441	14,860	17,565
SR-60	I-15 to I-215	94,704	67,547	6,155	4,962	109,776	105,513	8,796	10,948	78,798	56,202	8,221	6,629	93,869	94,167	10,862	12,615
SR-91	End to I-710	108,115	101,153	7,621	7,153	111,032	104,307	11,319	10,255	109,010	101,990	7,021	6,589	111,927	105,145	10,719	9,691
SR-91	I-710 to I-605	119,446	128,402	11,374	11,643	123,286	129,334	19,626	20,563	131,568	141,432	12,492	12,788	135,407	142,365	20,745	21,707
SR-91	I-605 to I-5	108,145	121,724	9,644	10,518	114,163	122,910	18,602	19,186	128,437	144,563	12,092	13,188	134,455	145,750	21,050	21,856
SR-91	I-5 to SR-57	107,156	93,716	10,197	10,200	116,260	127,617	17,162	21,863	125,362	109,638	6,802	6,805	134,466	143,540	13,767	18,468
SR-91	SR-57 to SR-241	102,346	113,931	8,970	9,643	136,712	138,493	16,481	19,578	134,393	149,607	6,249	6,842	168,759	174,168	13,761	16,777
SR-91	SR-241 to I-15	108,544	121,311	10,160	12,159	159,292	165,959	22,131	26,023	121,362	135,638	7,616	9,115	172,111	180,285	19,587	22,978

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
SR-91	I-15 to End	79,823	83,715	5,402	6,047	96,782	102,837	11,310	13,009	96,156	100,844	7,148	8,001	113,115	119,966	13,055	14,963
SR-118	I-405 to SR-23	83,626	93,505	4,003	5,133	98,698	108,516	5,794	7,606	112,363	125,637	11,076	14,204	127,435	140,648	12,867	16,677
SR-170	I-5 to SR-134	108,513	106,604	7,244	7,241	127,895	129,345	12,193	9,813	85,250	83,750	3,339	3,337	104,631	106,491	8,288	5,910

Note: N – North
S – South
E – East
W – West

Source: (a) SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model; (b) Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck Volumes; (c) Wilbur Smith Associates, 2007.

Table 9 presents the comparison of traffic volumes between the SCAG Model 2030 and the post-processed traffic volumes. In order to determine post-processed volumes for 2030, Caltrans existing Year 2030 data was added to the volume difference between SCAG 2030 and SCAG 2003 baseline traffic volumes.

Table 9
Traffic Volume Comparison Year 2030

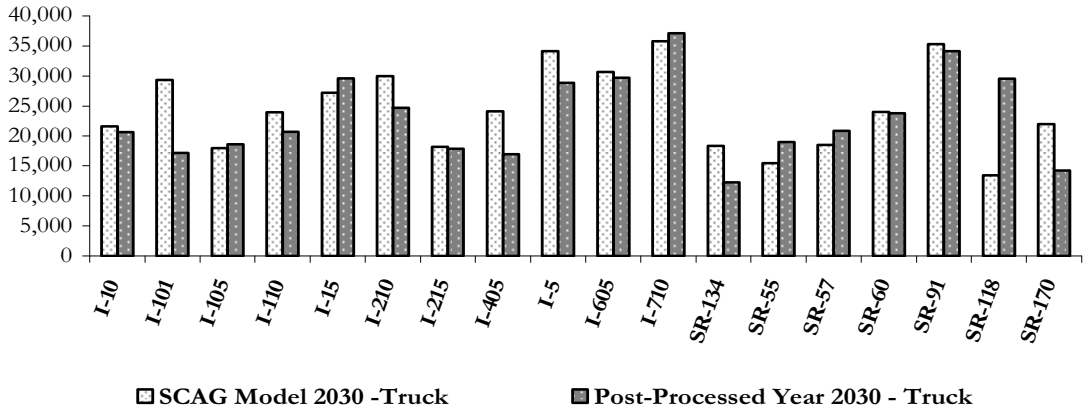
Route	SCAG Model 2030 -Vehicle	SCAG Model 2030 -Truck	Post-Processed Year 2030- Vehicle	Post-Processed Year 2030- Truck
I-10	242,869	21,637	254,027	20,647
I-101	303,189	29,322	283,225	17,171
I-105	184,343	17,945	198,677	18,570
I-110	241,419	23,953	221,046	20,745
I-15	203,135	27,211	236,353	29,602
I-210	208,177	29,969	244,391	24,701
I-215	193,798	18,178	136,286	17,844
I-405	275,257	24,102	289,072	16,943
I-5	285,731	34,129	290,342	28,885
I-605	235,981	30,664	216,554	29,698
I-710	209,074	35,766	192,984	37,134
SR-134	222,726	18,311	222,433	12,232
SR-55	234,364	15,433	272,124	18,984
SR-57	229,542	18,485	254,649	20,902
SR-60	248,431	24,011	223,096	23,794
SR-91	249,855	35,301	283,066	34,160
SR-118	207,214	13,400	268,083	29,544
SR-170	257,239	22,007	211,122	14,197

Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

The above table is summarized below.

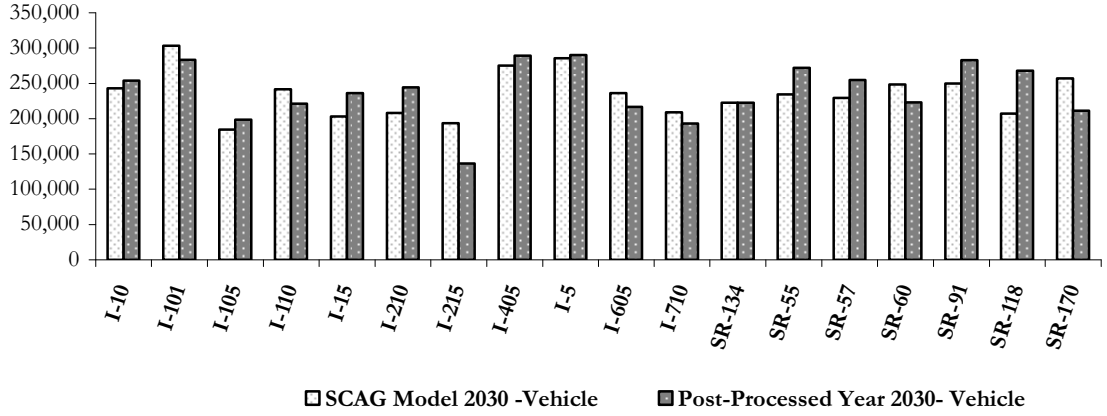
1. In comparison, the SCAG model estimated higher truck volumes on I-10, I-101, I-110, I-210, SR-60, and SR-91 than the post-processed traffic volumes. This indicates that SCAG forecasts more trucks on these freeways under existing conditions than actually present. Figure 22 present truck comparison between SCAG model and the post-processed volumes in 2030.

Figure 22
Total Truck Volume Comparison Year 2030



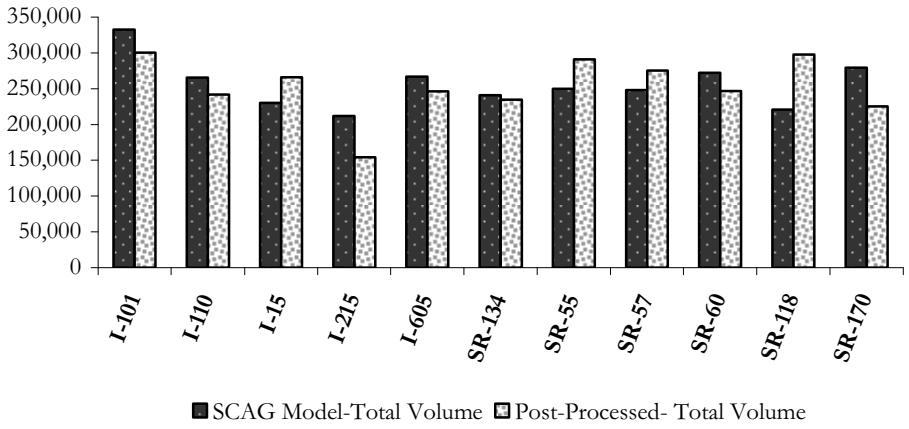
2. Figure 23 shows estimated higher vehicle volumes in 2030 on I-101, I-110, I-605, I-710, and SR-60 based on the SCAG model. This indicates that SCAG forecasts more vehicles on these freeways under existing conditions than actually present.

Figure 23
Total Vehicle Volume Comparison Year 2030



3. Figure 24 shows estimated higher truck and vehicle volumes on I-101, I-110, I-605, SR-134, and SR-60 based on the SCAG model in 2030, while post-processing results in higher truck and vehicle volume on I-15, SR-55, and SR-57 in 2030.

Figure 24
Total Traffic Volume Comparison Year 2030



Summary statistics from the baseline travel demand model run for daily trips are presented below:

- Approximate total truck trips by time period:
  - AM peak: **454,000**
  - PM peak: **685,000**
  - Nighttime (Off-peak): **749,000**
  - Midday: **1,208,000**
- Approximate total truck trips per day: **3,096,000**
- Approximate total traffic vehicle miles of travel (VMT) on SCAG highway network: **508,807,000**
- Approximate total truck VMT on SCAG highway network: **39,482,000**
- Approximate total traffic vehicle hours of travel (VHT) on SCAG highway network: **19,740,000**
- Approximate total truck VHT on SCAG highway network: **1,188,000**

As documented in Tech Memo 4a, truck traffic is forecast to increase significantly, fueled by the increasing growth in the study area's economy. Graphics presented above indicate capacity utilization and identification of congested segments of highway due to the increase in truck traffic based on the SCAG Draft 2030 AQMP Baseline model. Some of the most congested segments that also experience significant delays will be:

- I-5 between SR-118 and SR-14
- I-405 between I-10 and SR-118
- I-15 between SR-91 and SR-74 and through Cajon Pass

- I-215 between SR-74 and SR-60
- SR-14 between I-5 to SR-138
- I-5, US-101, I-10, and I-110 around the vicinity of downtown Los Angeles

Improvements Assumed

In the travel forecasting process, several assumptions have been made regarding capacity improvements to the existing highway system. The proposed capacity improvement projects assumed are listed in the SCAG 2004 RTP as baseline improvements. These assumed improvements consist of only projects in the 2002 Regional Transportation Improvement Program (RTIP) that had federal environmental clearance by December 2002 and committed funding. The list of assumed improvements contains hundreds of projects.

A complete listing for the baseline projects can be found under SCAG's 2004 RTP Technical Appendix I.

2.4 Conclusion

Baseline forecast information shows a substantial volume of vehicles on the MCGMAP study area highways. This includes both freight (truck) and passenger vehicles. Existing corridors of high truck traffic volumes will see substantial increases; for instance, SR-60 from I-710 to its terminus shows an increase of more than 10,000 trucks per day (greater than 100% increase) over existing volumes. This will result in highway segments of severe congestion and delay throughout the MCGMAP study area. Forecasted volumes for AM and PM peak periods will exceed available capacity on highway segments throughout the MCGMAP study area, particularly along corridors carrying high volumes of truck and vehicle traffic. Without improvements and strategies to reduce congestion (either through the provision of additional capacity or by the reduction in forecasted vehicle volumes), the highway system will face increasing delays and congestion.

Section 1.0 – Railway System Performance

1. "Los Angeles-Inland Empire Railroad Mainline Advanced Planning Study"; Los Angeles County Economic Development Corporation (LAEDC), 2002.

2. These figures compare with 255 trains per day through Colton Crossing and 189 trains per day through Cajon Pass forecasted in Table 1.

Section 2.0 – Highway System Performance

1. SCAG 2004 Regional Transportation Plan.

2. Ibid